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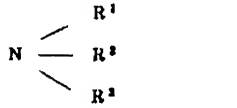
(54) FORMATION OF AMORPHOUS SILICON FILM WITH WIDE BAND GAP

(57) Abstract:

PURPOSE: To form the titled amorphous silicon (a-Si) film with satisfactory control efficiency in the manufacture of an a-Si film by a chemical vapor deposition (CVD) method by adding a specified amount of ammonia (deriv.) to a gaseous starting material.

CONSTITUTION: Ammonia (deriv.) represented by formula I and/or hydrazine (deriv.) represented by formula II is used. In the formulae each or R1WR7 is H, alkyl or aryl. A substrate is placed in a decomposition furnace, silane of higher order represented by formula III (where n is 2) such as disilane or trisilane is introduced into the furnace optionally together with an inert gas such as nitrogen, and the silane is thermally decomposed at about 250W600°C to deposit an a-Si film on the substrate. At this time, said ammonia (deriv.) and/or hydrazine (deriv.) is added to the silane by an amount satisfying relation represented by formula IV [where N is the amount of nitrogen in the ammonia (deriv.) and/or hydrazine (deriv.), and Si is the amount of silicon in the gaseous silane] to form an a-Si film with about 1.6W2.5eV band gap.



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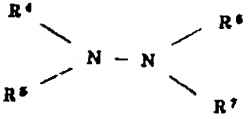

II

SiH_{2n+3} III

IV

$0.5 \leq N/Si$ （グラムーアトム比）